MODULAR TRAINING PRODUCTS

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Abstract *— A modern educational organisati on has to face many kinds of challanges these days. Even institutes which traditionally have been focusing to degree -oriented education have to be prepared for offering courses to new customer groups. Typical examples of such action are short courses offer ed to companies. In some cases this may require quite rapid responses to the customers' needs. On the other hand also the contents of the courses in the 'traditional' field change more often than before, at least the latest information has to be updated r egularely. These things offer a challange to the planning of courses: how to create high quality course materials efficiently.*

Course materials can nowadays consist of very diversified components (i.e. learning objects). That is mainly thanks to new distribution methods such as the internet or CD's.

In our project we have designed and accomplished a method to easily create learning objects –based course materials. The main goals in our project have been the reusability of learning objects and the mod ularity of courses: different courses may contain same learning objects and also some larger entireties such as lessons or even modules. With our method it is possible to manage the whole course material hierarchy (a learning object -> lecture -> course -> module).

The 'heart' of our system is a learning object database, which contains the learning objects or links to web sites which are used as learning objects in our courses. If a learning object is a file it is physically imported to the database. When a new learning object is added to the database also metadata is added to better describe the purpose of it. Our metadata describtion is based on a simpl ified version of IEEE LOM scheme . Creating a course in our system is based on 'jigsaw buzzle' –princip le. Learning objects can be picked from the database and connected to course lessons. The result from the end-users point of view is a simple web site which contains the course scedules, lessons and main materials and learning objects in a nice 'packet'.

Offering courses to different target groups requires a flexible tool for designing and accomplishing optimal material collections to each group. In our project we were not trying to 're -invent the wheel' by creating just another e -learning environment . On the contrary, our tool does not offer all services which are often provided by e -learning environments (discussion groups etc), but is clearly focused on efficient use of learning objects and can thus be used also together with other e-learning enviro nments.

Index Terms *—e-learning, learning objects, material distribution.*

LEARNING OBJECTS

One of the latest 'innovations' in eLearning is the use of learning objects. Learning objects are the core concept in an approach to learning content in which content is broken down into small chunks. These chunks can be reused, independently created and maintained, and pulled apart and stuck together. In principle a learning object does not have be in digital format i.e. it can any material offering a way to illustrate any phenomenon. In our courses we still consider learning objects as digitally stored illustrative objects.

To be able to manage and reuse a great number of learning objects, there has to be a way to include the information of the nature and the content of each learning object. If learning objects are shared to larger organisations or even world-wide via the internet, there has to be some kind of standard way to describe this information, which is usually called metadata. One attempt to do so is IEEE's Learning Object Metadata Standard [1]. This standard specifies the syntax and semantics of

Learning Object Metadata, defined as the attributes required to fully or at least adequately describe a Learning Object. Learning Objects are defined here as any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning. Relevant attributes of Learning Objects to be described include type of object, author, owner, terms of distribution, and format. Where applicable, Learning Object Metadata may also include pedagogical attributes such as teaching or interaction style, grade level, mastery level, and prerequisites.

Because the IEEE standard is planned to be universally applicable, it contains a lot of data, quite often even too much for practical work. Therefore a modified (i.e. shortened) list is usually used. In our case, where the general topic of the materials is allready outlined to production maintenance and the potential types of student groups could also be quite easily predicted, we decided to restrict the metadata only to most essential fields. Of course, if our learning objects will later be shared with other organisations, it is easy to enlarge their metadata description.

COURSE CUSTOMIZATION

Quite often the courses offered to companies are based on same substance. Then the course is tailored for the customer by paying attention to the company's needs. Therefore different courses may have quite a lot in common with each other as well as with regular, degree aiming courses. The same core of a course can be used in several different situations, only accompanied with case-specific learning objects.

Creating dynamic web based course materials requires active web services. Using standard html-pages is often too laborious and stiff for course material distribution. Dynamic, database based web applications offer the flexibility which is essential to course customization. The main prerequisite for dynamic course material managing naturally is the existence of the learning objects. In our case the starting point to course customization was the existing collection of learning objects and a large linklist to different kinds of educational or informative web sites.

The reusability of course materials can also be enlarged to contain larger components than learning objects. Guite often a whole lesson could be connected to several courses. In some cases even an entire course can be reused in another module. The principle of information hierarchy is presented in Figure 1.

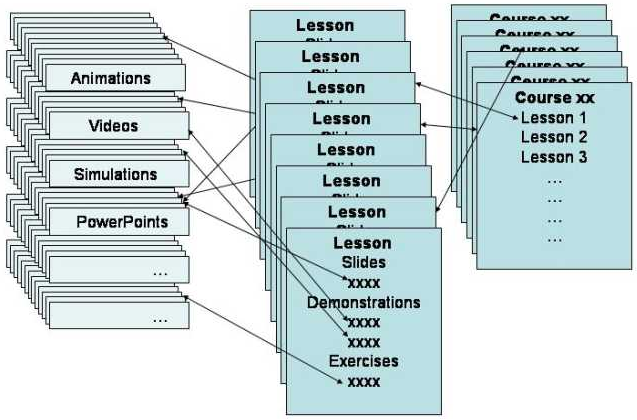

FIGURE 1
THE HIERARCHY OF INFORMATION

MODULAR TRAINING PRODUCTS

The tool - Modular Training Products (MTP) - we have developed is a database based application which contains a learning object library and tools for managing lessons, courses and modules. The tool is not a whole elearning environmet; it offers tools for managing the content but does not offer any tools for collaboration or other properties, which are usually managed

by eLearning software. This is a wilfull solution since there allready is a great number of eLearning applications available, some of them even free of charge. When those kind of properties are needed, we use applications like Moodle or WebCT together with MTP. On the other hand, quite often in commercial courses there is no need for more efficient web based collaboration than email.

Modular Training products is based on a learning object database, which either contains the learning objects or links to them depending on the nature and size of them. In principle there is no limation on the learning object type. It may be an animation as well as a link to a video lesson. When added into the database each learning object is classified and metadata is added.

The course administrator builds lessons to courses either by collecting suitable learning objects and slideshows from the database or by adding his own slides to the database. Whole lessons can also be picked from other courses. The final course forms a web page, which contains the introduction to the course, time-table and links to its lessons. Each lesson is a collection of slides, videolessons and other demonstrative components. The different connections to MLP are shown in Figure 2.

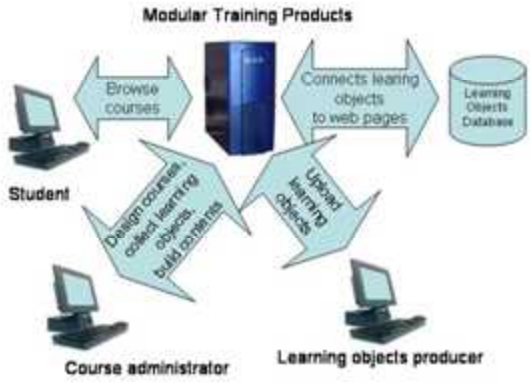

FIGURE 2
MODULAR TRAINING PRODUCTS PRINCIPLE

MTP is mainly used in connection with 'traditional' lessons. This means that the components which are distributed via MTP do not try to cover the whole course. Instead of that they can usually be considered as supplemental materials. MTP could naturally be used also as a part of a larger context, for example a course carried out with other elarning environments.

CONCLUSION AND FURTHER WORK

So far we have used our system in executing courses to our students aiming to bachelor degree and in commercially offered short courses. The tool offers an efficient way to compile course materials based on learning objects even at a short notice.

At the moment the course materials are similar to all participants of each course. On the other hand, since our system requires the user to login into one's account, it would be possible to quite easily also offer personalized contents based on the user's skills. In other words the user could belong to a certain group, like beginner or advanced user, and the system would filter the learning objects and other course materials based on that information. This option will require some additions to learning object metadata and changes to the database queries. In larger scale use, also the performances of the web and database servers play an essential role.

REFERENCES

[1] IEEE homepage, http://www.icee.org